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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,935	08/04/2003	Ronald E. Malmin	2003P07967 US	5783

7590 10/11/2007

EXAMINER	

Elsa Keller
Intellectual Property Department
Siemens Corporation
170 Wood Avenue South
Iselin, NJ 08830

ART UNIT	PAPER NUMBER

DATE MAILED: 10/11/2007

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,935	MALMIN, RONALD E.	
	Examiner	Art Unit	
	Constantine Hannaher	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-15,18,19 and 21-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-15,18,19 and 21-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on August 14, 2007 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 4, 22, 5, 7-10, 21, 11, 13-15, 18, 23-25, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) in view of Miraldi (US003688113A).

With respect to independent claim 1, Zeng discloses a gamma camera **22** (Fig. **2A**, column 5, lines 24-55) comprising a plurality of radiation sensitive detector elements **106** (Fig. 4), at least one solid-state photodetector coupled to the elements **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elements **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension $\mathbf{W}_y$). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of scintillating material (column 7, lines 31-35) and are elongated (dimension $\mathbf{C}_y$ of the detector

elements **106** is substantially the same as the dimension W_y of the slats **102**, column 7, lines 45-48) and thus constitute a "bar" within the meaning of the claim, arranged in a stack configuration (Fig. 4). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35) since no explicit description or illustration of such optical communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing **G** and reduce the resolution). Miraldi discloses a gamma camera **12** (column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19), at least one photodetector **96, 98** coupled by a physical attachment as is apparent in the view to at least one end of each crystal **86** normal to its elongated dimension (Fig. **7**), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. **7**) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-attached photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera of Zeng to specify that the photodetectors in the gamma camera **22** were physically attached to at least one end of the stack of elongated bar detector strips **106**.

With respect to dependent claim 2, Zeng discloses that each elongated bar detector strip **106** is in optical communication with an appropriate photodetector (column 7, lines 31-35). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in view of the suggestion of Miraldi, to modify the gamma camera **22** of Zeng to further comprise a plurality of photodetectors each physically attached to at least one end of each elongated bar detector strip **106** of the stack.

With respect to dependent claim 4, Zeng discloses that the photodetectors are photodiodes (column 7, line 35).

With respect to dependent claim 22, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach each of the elongated bar detector strips **106** in the stack of the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to dependent claim 5, Zeng discloses that the elongated bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 7, Zeng discloses each elongated bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 8, each of the individual slats **102** in the gamma camera **22** of Zeng has a length $\mathbf{W}_y$ matching the length $\mathbf{C}_y$ of the elongated bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 9, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of elongated bar detector strips **106** (Fig. 4).

With respect to dependent claim 10, see the explanation of the rejection against claim 8, and further the spacing **G** between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension $\mathbf{C_x}$ of the elongated bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and $2\mathbf{C_x}=2\mathbf{G}$).

With respect to dependent claim 21, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach the stack of elongated bar detector strips **106** in the gamma camera **22** of Zeng to at least a second photodetector at a second end of the stack as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 11, which differs from independent claim 1 in not requiring a "stack configuration" arrangement or a "solid-state" photodetector, Zeng discloses a gamma camera **22** (Fig. **2A**, column 5, lines 24-55) comprising a plurality of radiation sensitive detector elements **106** (Fig. 4), at least one photodetector coupled to the elements **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elements **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension $\mathbf{W_y}$). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of scintillating material (column 7, lines 31-35) and are elongated (dimension $\mathbf{C_y}$ of the detector elements **106** is substantially the same as the dimension $\mathbf{W_y}$ of the slats **102**, column 7, lines 45-48) and thus constitute a "bar" within the meaning of the claim (Fig. 4). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35) since no explicit description or illustration of such optical

communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing **G** and reduce the resolution). Miraldi discloses a gamma camera **12** (column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19), at least one photodetector **96, 98** coupled to at least one end of each crystal **86** normal to its elongated dimension (Fig. **7**), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. **7**) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-attached photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera of Zeng to specify that the photodetectors in the gamma camera **22** were physically attached to at least one end of the stack of elongated bar detector strips **106**.

With respect to dependent claim 13, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 14, Zeng discloses that the elongated bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 15, Zeng discloses each elongated bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 18, each of the individual slats **102** in the gamma camera **22** of Zeng has a length $\mathbf{W}_y$ matching the length $\mathbf{C}_y$ of the elongated bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 23, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of elongated bar detector strips **106** (Fig. 4).

With respect to dependent claim 24, see the explanation of the rejection against claim 18, and further the spacing **G** between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension $\mathbf{C}_x$ of the elongated bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and $2\mathbf{C}_x=2\mathbf{G}$).

With respect to dependent claim 25, Miraldi suggests photodetectors **96, 98** are physically attached to both ends of the scintillation crystal **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to physically attach each of the elongated bar detector strips **106** in the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 19, Zeng discloses a method of obtaining tomographic images (column 1, lines 12-13) of an object **200** (Fig. **6**) corresponding to the illustrated gamma camera **B** (Fig. **1**) which would comprise the steps of obtaining a plurality of sets of planar integral scintillation event data from the object **200** at a plurality of azimuth angles (column 8, lines 23-34) of a rotating scintillation detector (*e.g.*, Fig. **4** and column 7, lines 31-35) for each of a plurality of gantry angles of a gamma camera **22** (column 8, lines 6-21) and reconstructing the plurality of sets of planar integral scintillation event data to form a tomographic image of the object **200** (column 8, lines 43-56). The radiation sensitive detector elements **106** in the gamma camera **22** of Zeng are made of

scintillating material (column 7, lines 31-35) and are elongated (dimension $\mathbf{C_y}$ of the detector elements **106** is substantially the same as the dimension $\mathbf{W_y}$ of the slats **102**, column 7, lines 45-48) and thus constitute a "bar" within the meaning of the claim (Fig. 4). The gamma camera **22** of Zeng further comprises at least one photodetector coupled to each elongated bar detector strip **106** (column 7, lines 34-35) and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of elongated bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension $\mathbf{W_y}$). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of elongated bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35) since no explicit description or illustration of such optical communication is included. There are only six sides, however, to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack (because this would attenuate the radiation traveling towards the scintillator) or to the sides of the strips facing the collimator slats (because this would increase the slat spacing **G** and reduce the resolution). Miraldi discloses a gamma camera **12** (column 4, lines 1-2) comprising a plurality of scintillation crystals **86** (column 5, lines 15-19), at least one photodetector **96, 98** physically attached to at least one end of each crystal **86** normal to its elongated dimension (Fig. **7**), and a collimator **88** with a plurality of channels **94** for collimating each of the plurality of crystals **86** to receive gamma photons in only a single dimension. Thus Miraldi shows (Fig. **7**) that optical communication between an elongated bar detector strip made of scintillating material **86** and a photodetector **96, 98** in a gamma camera by physical attachment of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. In view of the good light collection from a long bar strip with end-coupled

photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends, column 6, lines 2-5), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were physically attached to at least one end of the elongated bar detector strips **106**.

4. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) and Miraldi (US003688113A) as applied to claims 2 and 11 above, and further in view of Iwanczyk *et al.* (US006521894B1).

With respect to dependent claims 3 and 12, the photodetectors in the gamma camera suggested by Zeng and Miraldi are "appropriate" (column 7, line 35). Iwanczyk *et al.* discloses that silicon drift detectors **11** (Fig. **1**) are an appropriate photodetector for coupling to a scintillator **37** in a gamma detector **10**, especially to a CsI scintillator **53** (Fig. **4B**) shaped as a rod. In view of the effective performance of silicon drift detectors in coupling to an elongated scintillation element as described by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera **22** suggested by Zeng and Miraldi to specify that the appropriate photodetectors physically attached to the stack of elongated bar detector strips **106** (or to the strips themselves) was of the silicon drift detector type.

Response to Submission(s)

5. The amendment filed August 14, 2007 has been entered.

6. Applicant's arguments filed August 14, 2007 have been fully considered but they are not persuasive.

The amendments to the claims recite a feature already shown by a reference. The Board found the Examiner's combination of Miraldi with Zeng reasonable where "Miraldi teaches mounting photomultipliers 96, 98 (20, 22 in Fig. 2) to opposite ends of a scintillation crystal 86

having a rectangular cross section (18 in Fig. 2) (Miraldi, Figs. 2 and 7; col. 4, ll. 17-32; col. 5, l. 5-col. 6, l. 49)." The Board found that the coupling of the photodetectors to the ends of the scintillation crystals by the disposition of the photomultipliers at both ends thereof in Miraldi was ample reason to provide "such a photodetector mounting in the arrangement of Zeng." See page 8 of the Board Decision. The remarks of applicant's representative do not overcome the deficiency noted by the Board at page 9 of its Decision.

For at least the reasons explained above, Applicant is not entitled to a favorable determination of patentability in view of the arguments submitted August 14, 2007.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Constantine Hannaher/
Primary Examiner
Art Unit 2884

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